

Abstract of the Invention

A thermal sensing catheter finds particular utility in detecting and isolating unstable arterial plaque. Miniaturized temperature sensors, preferably in the form of microthermistors, are embedded into expandable presentation elements disposed at the distal end of a catheter. The sensors may then be deployed to measure the surface temperature of the inner wall of coronary arteries or other vessels at multiple sites to identify sites of elevated temperature indicative of unstable plaque. The presentation elements may assume a “hand” type design or an alternate basket-type structure. A plurality of thermal sensors are embedded into the sides of polymeric or metallic sensing elements which expand out from the centerline of a catheter toward the inner vessel walls. An asymmetric encapsulation technique is preferably used to embed the sensors in close proximity against an outer wall of a sensing arm, while maintaining an insulative backing to reduce the effect of blood temperature on the backside of the arms excessively influencing plaque temperature measurements. The catheter assembly interfaces to a data box receiving signals from the sensing elements. The data box includes a display to present the calibrated readings from the sensors, as well as memory capabilities to store data for later download through a port incorporated in the housing. The output of the data box is provided to a computer, preferably in real-time and through the same port, to permit full-screen display of the thermal data. In either mode, a full recording of a procedure is saved for later analysis.